

WHAT IS CLAIMED IS:

1. A method for preparing a hydrogen generation reactor chamber to reduce coking, the method comprising applying a cold spray of an alkaline oxide or oxides doped with alkali or alkaline earth metals, mixed with small quantity of metal to principal surfaces within the chamber.
2. The method of claim 1 wherein the metal is selected from the group consisting of noble metals and alkaline metals.
3. The method of claim 1 wherein the percentage of metal to alkaline oxide in the cold spray is about 50% to about 90%, respectively.
4. The method of claim 1 wherein said hydrogen generation reactor chamber is comprised of at least one of aluminum, stainless steel, titanium and high temperature refractory alloys suitable for hydrogen generation.
5. The method of claim 1 wherein said hydrogen generation reactor chamber is further comprised of at least one port having a tube.
6. The method of claim 5 further comprising a step of applying a cold spray of an alkaline oxide mixed or oxides doped with alkali or alkaline earth metals, with small quantity of metal to a surface of said tube, said application to said tube occurring either during said application of said a cold spray to principal surfaces within the chamber or during a separate applying step.
7. The method of claim 6 wherein said applying step is directed to at least an inner surface of said tube.
8. The method of claim 6 wherein said applying step is directed to at least an outer surface of said tube.
9. The method of claim 6 wherein said tube protrudes into said hydrogen generation reactor chamber.

10. The method of claim 1, further comprising the step of depositing a catalyst on a support structure comprising at least one of metal foams, ceramic monoliths, foams, or mesochannels.

11. The method of claim 1 wherein said hydrogen generation reactor chamber has a cover, said cover having applied thereto a cold spray of an alkaline oxide mixed with small quantity of metal.

12. The method of claim 11 wherein said cover also has a hydrogen separation membrane incorporated therein.

13. The method of claim 10, wherein said mesochannels have a width of about 0.3 mm to 2.5 mm.

14. The method of claim 10, wherein said mesochannels have a width of about the 0.5 mm to about 2.0 mm.

15. The method of claim 1, wherein said cold spray is applied to leave portions of said hydrogen generation reactor chamber uncoated for joining operations.

16. The method of claim 16, wherein said joining operations comprise at least one of welding, brazing or diffusion bonding.

17. The method of claim 1, further comprising applying said cold spray to any protrusion into said hydrogen generation reactor chamber.

18. The method of claim 17, wherein said protrusions is at least one of tubings, thermowells and wells for sensor probes.

19. A cold spray coated hydrogen generation reactor chamber, comprising:
an inner surface of said hydrogen generation reactor chamber having a cold spray applied coating.

20. The cold spray coated hydrogen generation reactor chamber of claim 19, wherein said cold spray includes at least one of an alkaline oxide or oxides doped with alkali or alkaline earth metals, mixed with small quantity of metal.
21. The method of claim 1 wherein said hydrogen generation reactor chamber is tubular.
22. The method of claim 21 wherein said tubular hydrogen generation reactor chamber has covers or end-caps that contain one or more tubes.